European Scientific Journal February 2014 /SPECIAL/ edition vol.3 ISSN: 1857 – 7881 (Print) e - ISSN 1857- 7431

PHYSICAL - CHEMICAL AND BACTERIOLOGICAL ANALYSIS OF THE RIVER DRINI I BARDHE

Burim Haxhibeqiri
Faton Maloku
Ferdi Brahushi

Abstract

Water quality in the River Drini i Bardhë is influenced by various factors. The main influence comes from urban leaks, discharges of pollutants from wastewater, as well as infiltration from agriculture, discharges from industries which perform their activities in the river basin of Drini i Bardhë.

The purpose of this work is to provide data on water quality of river Drini i Bardhë , based on physical chemical and bacteriological monitoring form broad source of river until the end flow in Kosova.

In this paper are analyses of physical chemical and bacteriological parameters in water of river Drini i Bardhë, such as temperature, specific conductivity, total hardness, dissolved oxygen, potassium permanganate value, turbidity, nitrites, ammonia, phosphates, iron, manganese as well as bacteriological parameters, such as total number of coliform bacteria in 100 ml, fecal originating coliform bacteria in 100 ml, the total number of aerobic mesophilic bacteria.

Water samples were analyzed in physical chemical and bacteriological laboratory, with methods like volumetric method, atomic absorption method (AAS), spectrophotometric methods, etc.

During this research parameters that were measured are physical chemical and bacteriological and they were presented in tables. They are considered important indicators in the river Drini i Bardhë and they indicate an elevated presence of all the parameters due to several tributary river inflow into the river Drini i Bardhë. In these statements of test results is given a general water quality of the river Drini i Bardhë relying on the based on chemical, physical and bacteriological contamination that show the quality of the river Drini i Bardhë as consequence of urban and, pollutant dischargers..

Keywords: River, Drini i Bardhe , physical - chemical and bacteriological parameters

Introduction

Drini i Bardhe is river that crosses the western part of Kosovo, respectively Dukagjini flat. River Drini i Bardhe originate from Radavc cave of Rusolia mountain, at 586 m above sea level, before it descend in plane and joins with river Drini i Zi near town of Kukes forming river called DRINI that in ancient times was known as *Drillon*. At of source it has 30 m per second. Surface of White Drin basin is 4265 km2 in Kosovo. Tributaries of Drini are Peja Lumbardhi, Erenik, Prizren Lumbardhi.

Waters of River Drini i Bardhe constitute a substantial part of the hydrographic network of Kosovo and represent a great wealth of our country.

The main influence on the White Drin pollution is from urban discharges of pollutants from wastewater, also infiltration from agriculture, discharges from industries that perform their activities in the river basin of river Drini i Bardhe.

The purpose of this work is to provide data on water quality of river Drini i Bardhe , based on physical chemical and bacteriological monitoring form broad source of river until the end flow in Kosovo.

Materials and methods

In this paper are analyses of physical chemical and bacteriological parameters in water of river Drini i Bardhë, such as temperature, specific conductivity, total hardness, dissolved oxygen, potassium permanganate value, turbidity, nitrites, ammonia, phosphates, iron, manganese as well as bacteriological parameters, such as total number of coliform bacteria in 100 ml, fecal originating coliform bacteria in 100 ml, the total number of aerobic mesophilic bacteria.

Sampling was made on 26 January 2013, where the air and water temperature was low. Sampling locations were chosen based on those sites where pollution is expected, close to restaurants, traffic etc. 1 liter of water were taken as sample.

Water samples were analyzed in physical – chemical and bacteriological laboratory with: volumetric method, atomic absorption method (AAS), spectrophotometric methods, etc.

Results

Tabele no 1.Results of physical-chemical and bacteriological analysis of river Drini i Bardhe

Data: 26.01.2013		Radav c	River Kline-Drini			River Mirush-Drini		
Parametres		I	II	III	IV	V	VI	VII
A. Physical - chemical	h	8:45h	09:50 h	11:10 h	11:20 h	12:00 h	12:10 h	12:20 h
Temperatura e ajrit	^{0}C	-4	-3.8	-3.5	-3.5	-3	-3	-3
Temperatura e ujit	^{0}C	4.8	5.2	5.2	5.2	5.4	5.3	5.3
Turbullira	NTU	0.69	5.17	3.98	4.05	3.65	3.75	3.69
Vlera e pH-së	-	7.61	7.92	7.68	7.76	7.78	7.77	7.77
Hargjimi i $KmnO_4$	mg/dm^3O_2	2.84	6.32	6	6.32	5.68	5.68	6
Perquesh. Spec.	µs/cm	285	397	324	316	321	364	343
Fortesia. Totale	^{o}dH	7.14	8.12	8.4	8.12	7.84	8.12	8.12
Mbetja pa avu.	mg/dm^3	171	238.2	194.4	189.6	192.6	218.4	218.4
Kloruret	mg Cl^- /dm^3	7.09	11.69	8.5	9.21	9.92	8.5	9.21
Oksigjeni i tretur	mgO_2/dm^3	12	11.3	11.5	11.4	11.3	11.8	11.7
Amonjaku,N-NH_3	mgN/dm^3	0.08	0.15	0.12	0.18	0.14	0.17	0.16
Nitritet, N-NO_2^-	mgN/dm^3	0.003	0.015	0.015	0.017	0.013	0.014	0.012

Nitratet, N-NO_3^-	mgN/dm^3	0.045	0.22	0.22	0.25	0.195	0.21	0.18
Fosfatet	mgP/dm^3	0.19	0.29	0.25	0.28	0.27	0.26	0.25
Hekuri	mgN/dm^3	0.04	0.16	0.1	1.1	0.15	0.13	1.4
Mangani	$mgMn/dm^3$	0.009	0.028	0.02	0.027	0.026	0.017	0.021
Parametrat Bakteriologjik								
Bakteret totale coliforme		20	80	150	150	100	150	130
B.colif prejardhje fekale		-E.coli	-E.coli	-E.coli	-E.coli	-E.coli	-E.coli	-E.coli
Nr. i b.aerobe mezofilike		30	120	200	200	150	200	180

Tabele no 2.Results of physical-chemical and bacteriological analysis of river Drini i Bardhe

Data: 26.01.2013		Lumbardh i D.-Drini			Ereniku-Drini			Lumbardh i P.-Drini		
Parametres		VIII	IX	X	XI	XII	XIII	XIV	XV	XVI
	h	13:00h	13:15h	13:30h	14:30h	14:45h	15:00h	16:00h	16:20h	16:40h
Temperature air TºC	^0C	-2.8	-2.5	-2.5	-2.5	-2.5	-2.7	-3	-3	-3
Temperature water TºC	^0C	5.2	5.3	5.2	5.4	5.4	5.4	5.3	5.3	5.5
Turbidity	NTU	3.16	4.52	4.23	5.06	4.67	4.82	4.83	5.01	4.94
pH value	-	7.68	7.82	7.8	7.89	7.83	7.85	7.86	7.81	7.84
$KMnO_4$ value	$mg/dm^3 O_2$	5.37	5.68	6	7.26	6.32	3.79	6.95	6.32	6.16
Electr.conductivity	µs/cm	311	375	369	408	389	399	321	379	362
Total hardness	ºdH	7.56	8.4	8.12	8.68	8.4	8.12	8.12	8.4	8.12
Dry residue	mg/dm^3	186.6	225	221.4	244.8	233.4	239.4	192.6	227.4	217.2
Chlorides	$mg\ Cl^-/dm^3$	9.21	8.5	8.8	12.4	9.92	10.63	11.69	9.21	9.92
Dissolved oxygen	mgO_2/dm^3	11.9	11.7	11.7	11.6	11.8	11.4	11.5	11.7	11.8
NH4 + ammonium	mgN/dm^3	0.11	0.12	0.12	0.19	0.22	0.14	0.21	0.19	0.16
Nitrites(NO_2)	mgN/dm^3	0.011	0.012	0.012	0.02	0.012	0.016	0.018	0.014	0.015

Nitrates NO_3	mgN/dm^3	0.165	0.18	0.18	0.3	0.18	0.24	0.27	0.21	0.22
PhosphatePO_4	mgP/dm^3	0.23	0.27	0.25	0.29	0.26	0.27	0.28	0.24	0.25
Iron(Fe)	mgN/dm^3	0.09	0.14	0.12	0.19	0.15	0.16	0.17	0.16	0.15
Manganese(Mn)	$mgMn/dm^3$	0.025	0.017	0.024	0.035	0.024	0.023	0.027	0.024	0.025
Bacteri.indicators										
Total no. coliform		120	140	150	150	100	170	130	150	140
E.coli		- E.coli	- E.coli	- E.coli	- E.coli	- E.coli	- E.coli	- E.coli	- E.coli	- E.coli
Total no. of viable bac.		150	180	200	200	150	250	180	200	180

Diagram no.1: Turbidity, pH value, $KMnO_4$ value.

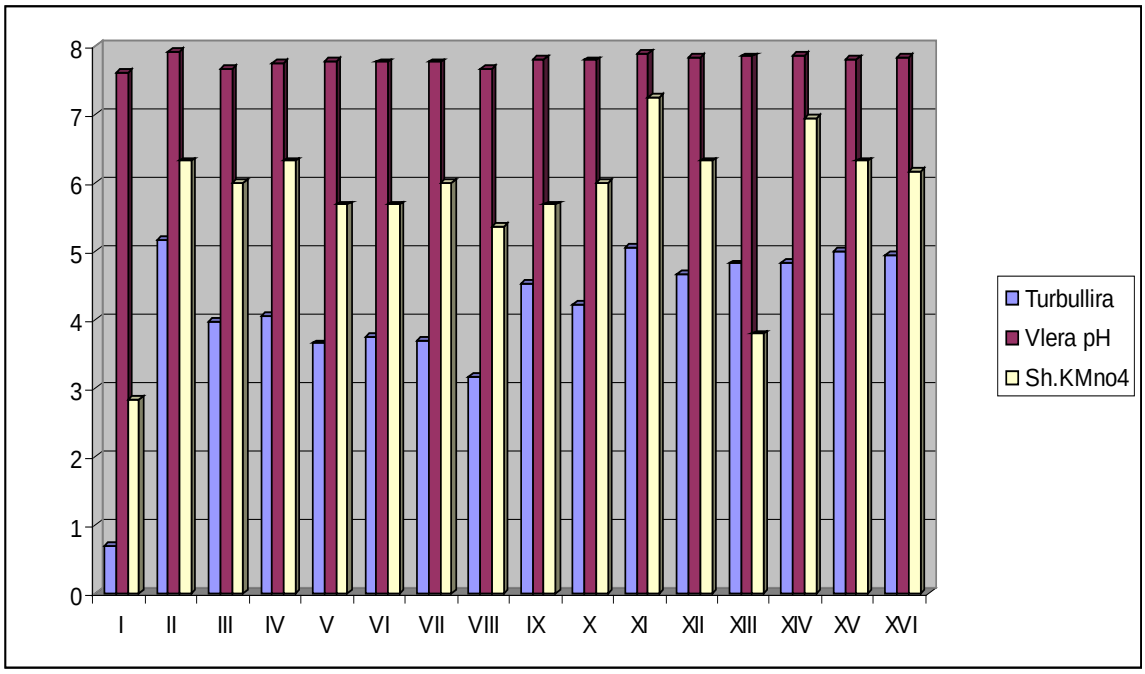
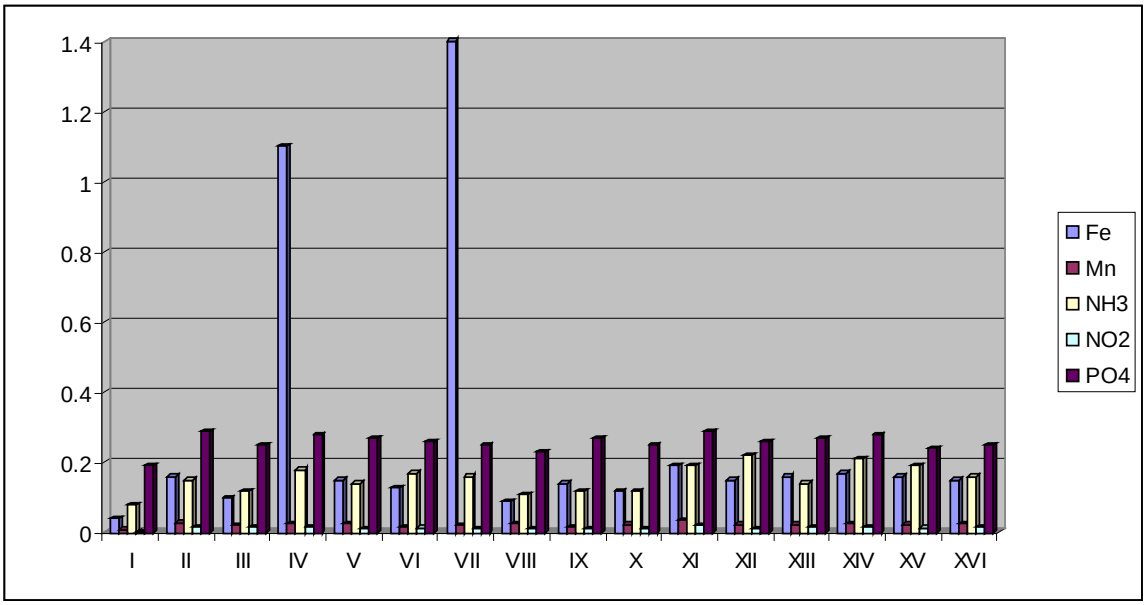


Diagram no.1: Iron(Fe), Manganese(Mn), NH4 + ammonium, Nitrites(NO_2), PhosphatePO_4



Discussion

During the winter season of 2012, were performed physical chemical and bacteriological analyses, in 16 locations of river Drini i Bardhë. Analyzed parameters were: temperature, turbidity, pH value, total hardness, dissolved oxygen, KMnO4 vakue, nitrite, manganese, iron, ammonia, phosphates, etc..

Water temperature is an important parameter, the results of the analysis show that there are differences from the first location with temperature 4.8 ° C up to highest temperature of 5.5 ° C.

Turbidity ranges from 0.69 NTU on first location up to 5.17 NTU on the second location.

Dissolved oxygen in water varies from 11.3-12 mg / l, indicating that the amount of oxygen is high due to the low water temperature.

The pH value results from 7.61 to 7.92; result presented show that the pH value is not increased much.

Potassium permanganate value is lowest in the water at location 1 (2.84 mg / l) and highest in the location 11 (26.7 mg / l).

Nitrites range from 0.003 mg / l in the first location up to 12:02 mg / l in the location eleven.

Ammonia values were lowest in the location one (0.08 mg / l), while the highest values were in location twelve (0.22 mg / l).

Conclusion

Based on research done in the river Drini i Bardhe , in January 2013, we can draw the following conclusions:

Water samples of river Drini i Bardhe were analyzed in order to determine the physical-chemical and bacteriological parameters, as well as some elements that can be found in traces.

In the results of test is given a general water quality of the river Drini i Bardhe based on chemical, physical and bacteriological results that show the contamination of river Drini i Bardhë as consequence of urban discharges of pollutants from wastewater etc

It is recommended that the governmental institutions exercise their responsibility to institutions for preservation of water, so that:

- to monitor waters;
- to gradually decrease pollution, degradation and other activities that pose grate risk to the water environment;
- Protection of water should be based on the gradual introduction of European Union Standards.

References:

Cullaj,A Kimia e Mjedisit,Tirane,2010 fq(281-315).
Haxhimihajli Dh., Teknoligjia kimike inorganike,Tirane 1980
Korca B., Analiza kimike e ujit, Prishtine 2001.fq(72-101).
D.T.E. Hunt.,A.L.Wilson.,-The chemical Analysis of water 1995
Haxhimihali Dh., Haxhi H., Karaxhozi H., Fjalor i Kimise,Tirane, 1984
Marjanov M., Degremont Tehnika Precscavanja voda, Beograd 1976.
Dalmacija B., Kontrolla kvaliteta voda,Novi Sad, 2000
Hoxha B., Kimia analitike- pjesa praktike, Prishtine, 1999
Plakolli,M: Praktikum per Mikrobiologji,Prishtinë 2001.
Djordjevic, A: Bakteriologija I i II deo,Beograd,Naucna knjiga,1950.
N.F.Voznaya:hemistryof Waterand Microbiology,Mir publishers,Moscow,1981,p.127.
Hysko M, Microbial manual.-Shtëpia botuese e librit Universitar, Tirane 2004.